Making Sense of Your Five Senses

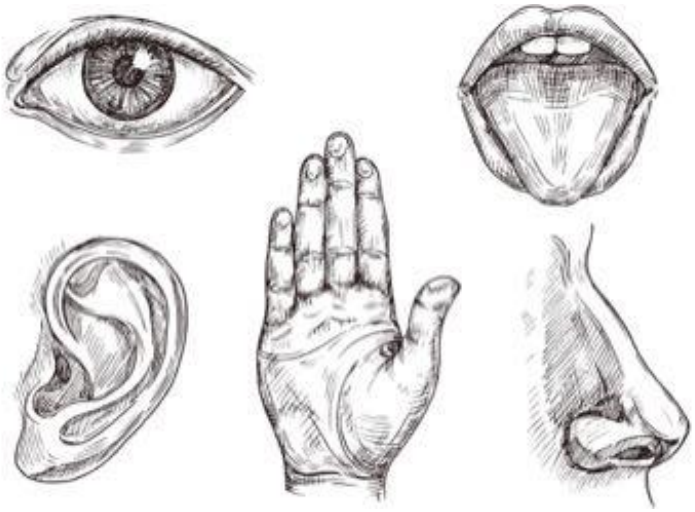
(adapted from askthescientists.com)

As soon as you get out of bed, your five senses are hard at work. The sunlight coming in through your window, the smell of breakfast, the sound of your alarm clock - all these "bits of experience" are the product of your environment, sensory organs, and your brain.

The ability to hear, touch, see, taste, and smell is hard-wired into your body. Sensations are collected by sensory organs and interpreted in the brain. Your five senses connect you to your environment and allow you to learn and make decisions about the world around you.

The sensory organs in your body are connected to your brain via nerves. Your nerves send information via electrochemical impulses to the brain.

What are Your Five Sensory Organs?



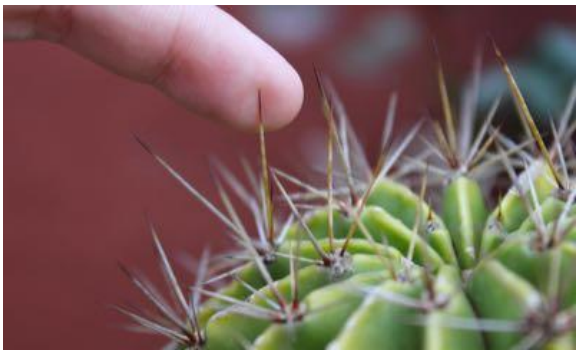
There are **five basic senses** perceived by the body. They are **hearing, touch, sight, taste, and smell**. Each of these senses is a tool your brain uses to build a clear picture of your world.

Your brain relies on your **sensory organs** to collect sensory information. The organs involved in your five senses are:

- Ears (hearing)
- Skin and hair (touch)
- Eyes (sight)
- Tongue (taste)
- Nose (smell)

Touch

Your **skin** is the largest organ in the body and is also the primary sensory organ for your sense of touch. **The scientific term for touch is *mechanoreception*.**



Touch seems simple but is a little bit more complex than you might think. Your body can detect different forms of touch, as well as variations in **temperature** and **pressure**.

Because touch can be sensed all over the body, the nerves that detect touch send their information to the brain across the peripheral nervous system. These are the nerves that branch out from the spinal cord and reach the entire body.

Nerves located under the skin send information to your brain about what you touch. **There are specialized nerve cells for different touch sensations.** The skin on your fingertips, for example, has different touch receptors than the skin on your arms and legs.

Fingertips can detect changes in **texture** and **pressure**, like the feeling of sandpaper or pushing a button. Arms and legs are covered in skin that best detects the stretch and movement of joints. The skin on your limbs also sends your brain information about the position of your body.

Your lips and the bottoms of your feet have skin that is more sensitive to light touch. Your tongue and throat have their own touch receptors. These nerves tell your brain about the temperature of your food or drink.

Taste

Taste (or *gustation*) allows your brain to receive information about the food you eat. As food is chewed and mixed with saliva to help break it down, your **tongue** is busy collecting sensory data about the taste of your meal.

The tiny bumps all over your tongue are responsible for transmitting tastes to your brain. These bumps are called **taste buds**. And your tongue is covered with thousands of them! Every week, new taste buds replace old ones to keep your sense of taste sharp.

At the center of these taste buds are 40–50 specialized **taste cells**. **Molecules from your food bind, or attach, to these specialized cells and generate nerve impulses.** Your brain interprets these signals, so you know how your food tastes.

There are **five basic tastes** sensed by your tongue and sent to the brain. They are **sweet, sour, bitter, salty, and umami**. The last taste, umami, comes from the Japanese word for "savory." Umami tastes come from foods like broth and meat.

A classic example of sweet taste is sugar. Sour tastes come from foods like citrus fruits and vinegar. Salt and foods high in sodium create salty tastes. And your tongue senses bitter taste from foods and drinks like coffee, kale, and Brussels sprouts.

A formerly accepted theory about taste was that there were regions on the tongue dedicated to each of the five tastes. This is no longer believed to be true. Instead, current research shows each taste can be detected at any point on the tongue.

So, during meals or snacks, your brain constantly receives information about the foods you eat. Tastes from different parts of a meal are combined as you chew and swallow. Each taste sensed by your tongue helps your brain perceive the flavor of your food.

Sight

Sight (also known as *vision*) is created by your brain and a pair of sensory organs—your **eyes**. It is often thought of as the strongest of the senses. That's because humans tend to rely more on sight, rather than hearing or smell, for information about their environment.

Light on the visible spectrum is detected by your eyes when you look around. Red, orange, yellow, green, blue, indigo, and violet are the colors found along the spectrum of visible light. The source of this light can come from a lamp, your computer screen, or the sun. When **light is reflected off of the objects around you** and subsequently **reaches your eyes**, they send signals to your brain via the **optic nerve**, and a recognizable image is created.

Have you ever gotten ready in the dark and accidentally put on socks that don't match?

That's because **your eyes need light to send sensory information** to your brain. Light enters the eye through the **pupil** and is focused on the **retina** (the light-sensitive portion of the eye). What you "see" when you open your eyes is your brain's interpretation of the light entering your eyes. And it's easiest for your brain to make sense of your surroundings when there is an abundance of light. That's why it's so challenging to pick out matching clothes in the dark!

Hearing

The scientific term for hearing is *audition*. But this kind of audition shouldn't make you nervous. Hearing is a powerful sense that allows your brain to perceive its surroundings by means of detecting **sound waves**.

Your **ears** receive and amplify sound waves and your brain interprets them as dialogue, music, laughter, or much more (and sometimes just noise!).

Ears come in a variety of shapes and sizes. But they share similarities. The outer, fleshy part of the ear collects the sound waves transmitted in your environment and funnels them toward a **membrane, known as the ear drum**, at the end of the ear canal.

Once the sound waves enter the ear and are amplified by the ear drum, they travel to fluid-filled tubes deep in the ear. They're lined with microscopic **hair-like cells** that can detect shifts in the fluid that surrounds them. When sound waves are present, the fluid starts to move. The movement of fluid across the hair cells in the ear generate **nerve impulses** that are sent to the brain.

Smell

Olfaction, another word for **smell**, is unique because the sensory organ that detects it is directly connected to the brain. This makes your sense of smell extremely powerful!

Smells enter your body through the **nose**. They come from **airborne particles** captured while you breathe. Inhaling deeply through your nose and leaning towards the source of an odor can intensify a smell.

Inside your nose is a **large nerve called the olfactory bulb**. It extends from the top of your nose and plugs directly into your brain. The airborne molecules breathed in through your nose trigger a nervous response by the olfactory bulb. It notices odors and immediately informs your brain.

Higher concentrations of odor molecules create deeper stimulation of the brain by the olfactory bulb. This makes very strong scents unappealing and nauseating. Lighter fragrances send more mild signals to your brain.

It's rare that your brain makes decisions based on the information from a single sense. Your **five senses work together** to create strong sensations and paint a complete picture of your environment.